

# Thermodynamics

## Thermal energy

- Total internal energy of particles in a substance (sum of kinetic and potential energies of molecules inside the object)
- Everything with molecules has thermal energy
- More molecules = more thermal energy

## Heat (Q)

- Thermal energy that flows as a result of difference in temperature
- Measured in Joules

## Temperature

- Directly relates to kinetic energy of molecules
- Average kinetic energy of molecules in a substance
- Does not depend on the mass of the object
- Measured in Celsius, Kelvin, Fahrenheit

## Kinetic-molecular Theory

- Four main components

- 1) Matter is made of particles that are constantly in motion
- 2) The amount of kinetic energy in a substance is related to its temperature
  - a. Hot body has faster moving particles and therefore has higher energy and temperature than a cooler body
- 3) Change in phase may occur when the energy of the particles is changed
- 4) There are space between particles
  - Solid = least space, gas = most space